

T. A. MARTIN.
INTERNAL COMBUSTION ENGINE.
APPLICATION FILED APR. 19, 1909.

968,380.

Patented Aug. 23, 1910.

2 SHEETS—SHEET 1.

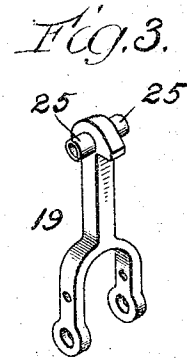
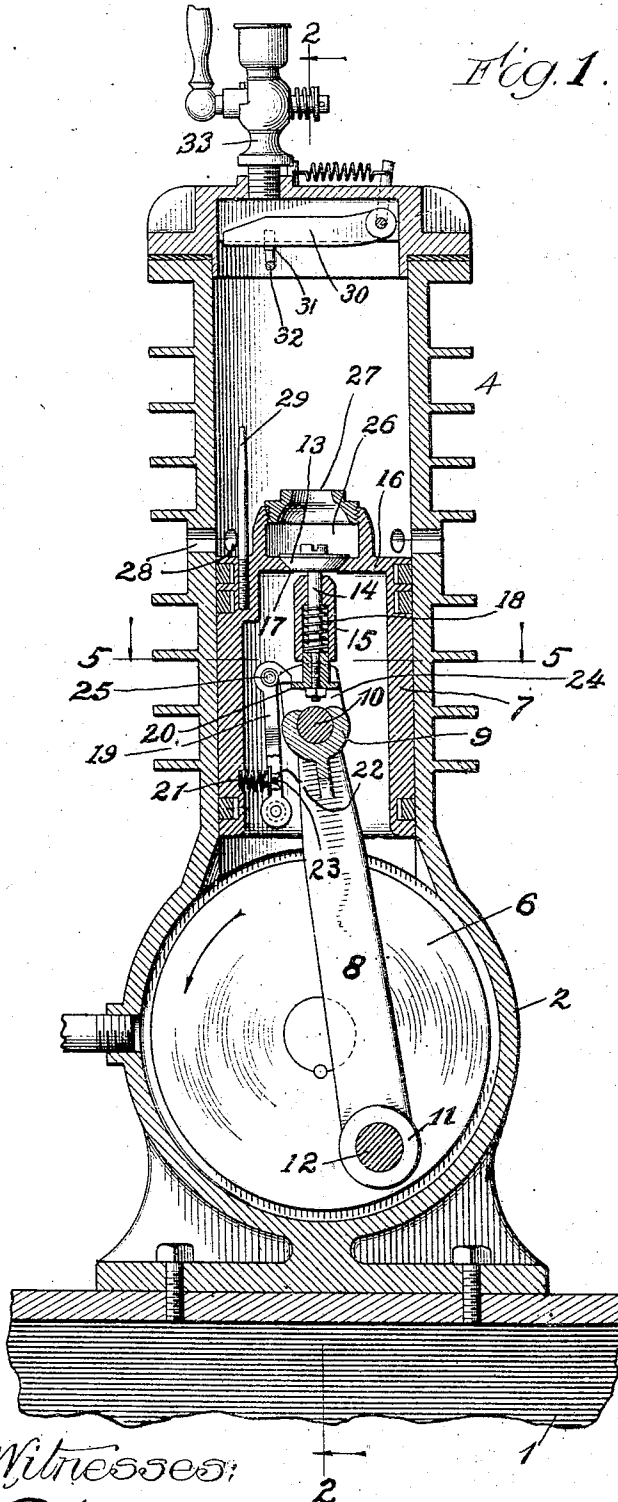
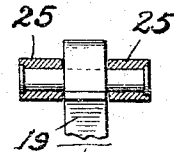


Fig. 4.



Witnesses:
Robert M. Weir
George L. Chindahl

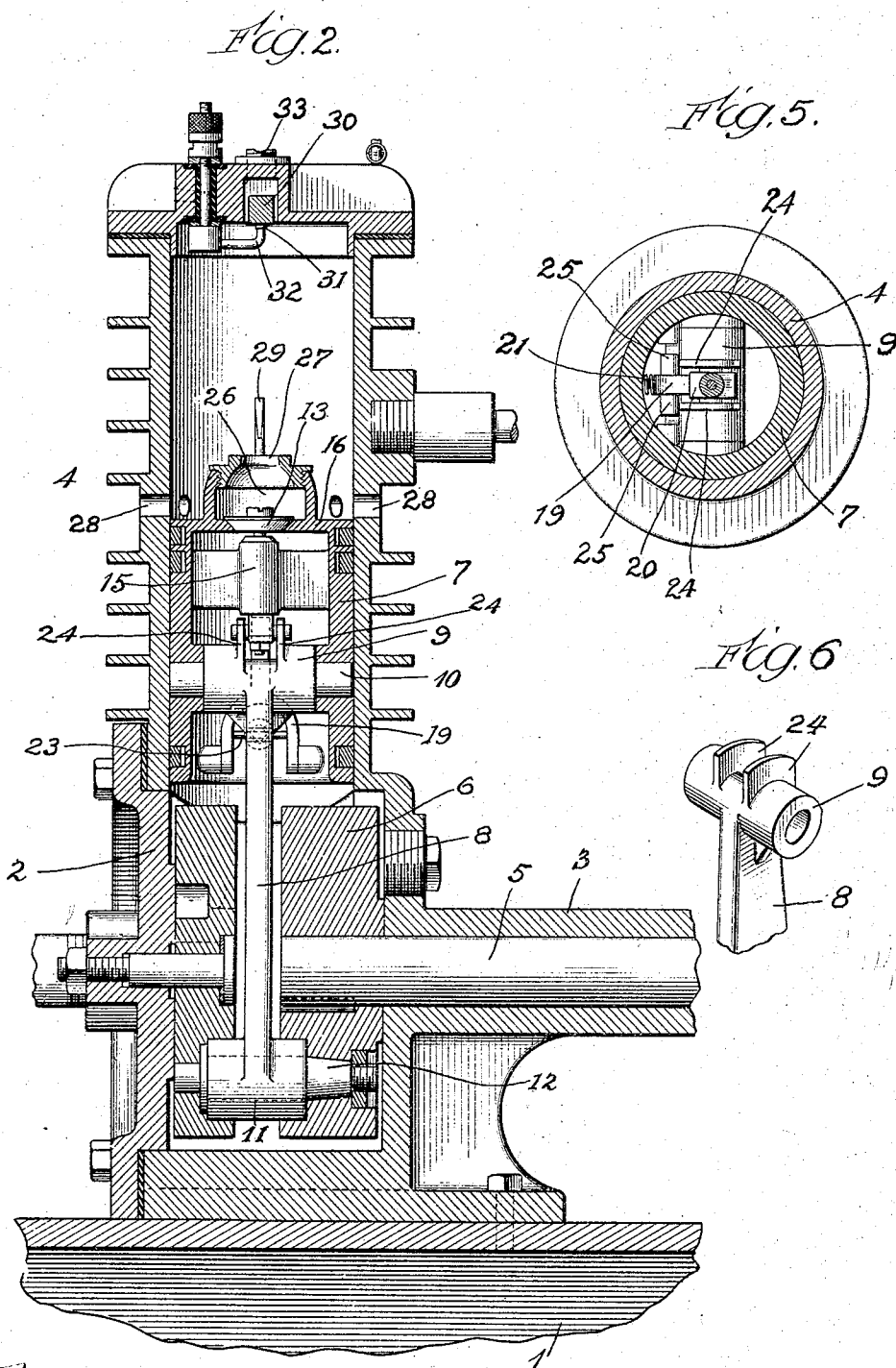
Inventor:
Thomas A. Martin
By Luther L. Miller
Att'y.

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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

THOMAS A. MARTIN, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO SEARS, ROEBUCK AND CO., OF CHICAGO, ILLINOIS, A CORPORATION OF NEW YORK.

INTERNAL-COMBUSTION ENGINE.

968,380.

Specification of Letters Patent. Patented Aug. 23, 1910.

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To all whom it may concern:

Be it known that I, THOMAS A. MARTIN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Internal-Combustion Engines, of which the following is a specification.

This invention relates particularly to internal combustion engines of the two-cycle type.

The object of the invention is to improve the means for admitting the explosive mixture to the cylinder.

In the accompanying drawings, Figure 1 is a vertical central section through an engine embodying the features of my invention, a portion of the base being broken away. Fig. 2 is a section on line 2 2 of Fig. 1. Fig. 3 is a perspective view of the dog controlling the inlet valve. Fig. 4 is a detail of the upper end of said dog. Fig. 5 is a section on line 5 5 of Fig. 1. Fig. 6 is a perspective view of the upper end of the connecting rod.

The embodiment that has been selected for illustration comprises a base 1 of any suitable form, upon which are supported a crank case 2, a bearing 3 for the crank shaft and a cylinder 4. The crank shaft 5 has a crank disk 6 fixed to its inner end within the crank case 2.

A trunk piston 7 is slidably mounted within the cylinder 4 and is connected with the crank disk 6 by means of a connecting rod 8. Upon the upper end of the connecting rod is a bearing 9 for a pin 10 carried by the piston, the lower end of said connecting rod having a bearing 11 for the wrist pin 12.

The entrance of the explosive mixture into the crank case 2 may be controlled by a valve mechanism of any common or preferred construction. The means by which the charge is admitted from the crank case to the combustion chamber comprises a valve member 13 having a stem 14 which is slidably mounted in a bearing 15 carried by the piston 7. The valve member 13 is arranged to seat upon a valve seat formed upon the outer or upper side of the end wall 16 of the piston, said seat surrounding an inlet port 17 in said wall. A coiled spring 18 tends to seat the valve member 13. The valve member is positively held seated during the down stroke of the piston by means of a dog 19

adapted to engage a projection 20 carried by the valve stem 14. Said dog may be bifurcated as shown in Fig. 3, and pivotally mounted within the piston 7. A coiled spring 21 bearing at one end upon the annular wall of the piston and at its other end upon a spring seat 22 tends to move the dog into engagement with the projection 20. The spring seat 22 engages a pin 23 carried by the dog 19.

Upon the upper end of the connecting rod 8 and above the pivot pin 10 is means for withdrawing the dog 19 from engagement with the projection 20 at the proper time in the travel of the piston. Said means may consist of two fingers 24 having rounded ends adapted to engage roller studs 25 upon opposite sides of the upper end of the dog 19. Upon the outer or upper side of the wall 16 of the piston is a chamber 26 having a discharge port 27 for the explosive mixture.

A peripheral series of exhaust ports 28 is provided in the walls of the cylinder 4 in position to be uncovered near the end of the working stroke of the piston 7.

Any suitable form of igniting means may be used, that herein shown comprising a pin 29 attached to the piston 7 in position to engage a movable arm 30 carried by the cylinder head. The arm 30 carries a platinum contact 31 adapted to normally engage a stationary contact pin 32 which is fixed to and insulated from the cylinder in any suitable way, said arm being movable by the pin 29 away from the contact 32 to draw a spark and thus ignite the charge in the well known way.

33 is a valved tube through which gasoline may be admitted to the cylinder 4 for starting the engine, and may be opened to permit the charge to escape, when desired.

During the down stroke of the piston the valve 13 is positively held seated by the dog 19. Shortly after the piston begins its upward stroke the fingers 24 are tilted into engagement with the dog 19, withdrawing said dog from the projection 20, whereupon the compressed gases in the crank case lift the valve 13, and, passing through the port 17 and the outlet 27, strike the cylinder head, and, spreading out, drive the burned gases out through the exhaust ports 28. The piston 7 continuing its upward movement, closes the exhaust ports 28, the valve

13 is seated by the spring 18, and the piston compresses the charge within the cylinder. The compressed charge is exploded through the operation of the igniting means, driving the piston downward.

The moment at which the valve 13 is opened may be advanced or delayed by suitably changing the form of the upper ends of the fingers 24.

It will be seen that the fresh charge is injected into the combustion chamber in an axial stream which expands as it reaches the upper ends of said chamber, thereby sweeping out before it the products of the last previous explosion.

The gases compressed within the crank case during the downward movement of the piston form a cushion for said piston, permitting the shaft 5 to run loosely in its bearing 3 without pounding. Similarly the charge compressed in the cylinder by the upward movement of the piston cushions the upward stroke of said piston.

I would have it understood that the invention is not limited to the details of construction herein set forth, for various modifications may be made by those skilled in the art.

I claim as my invention:

1. In an internal combustion engine, in combination, a cylinder; a piston in said cylinder; a chamber in which explosive fluid may be compressed by said piston; a valve carried by said piston for controlling communication between said chamber and the cylinder; a spring-pressed dog for holding said valve closed at times; a crank and connecting rod operatively connected with said piston; and means on said rod for moving said dog out of engagement with said valve.

2. In an internal combustion engine, in combination, a cylinder; a piston in said cylinder; a chamber in which explosive fluid may be compressed by said piston; a valve carried by said piston for controlling communication between said chamber and the cylinder; a spring-pressed dog for holding

said valve closed at times; a crank operatively connected with said piston; and means moved by said crank for moving said dog out of engagement with said valve.

3. An inlet mechanism for internal combustion engines, comprising a trunk piston, a valve member controlling an inlet port formed through the end wall of said piston, a slidably mounted and spring-pressed stem for said valve member, a spring-pressed dog carried by said piston, a projection on said stem for engagement by said dog, and means for moving said dog out of engagement with said projection.

4. In an internal combustion engine, in combination, a cylinder; a trunk piston arranged to uncover exhaust ports in said cylinder near the outer limit of its movement; a crank case having means for admitting an explosive fluid thereto; a crank in said case; a rod connecting said crank and said piston; a spring-pressed valve member slidably mounted in said piston and controlling communication between said crank case and the cylinder; a spring-pressed dog carried by said piston and adapted to hold said valve member seated during the working stroke of the piston; and a member on the upper end of said connecting rod arranged to withdraw said dog from said valve.

5. In an internal combustion engine, in combination, a cylinder; a piston in said cylinder; a chamber in which explosive fluid may be compressed by said piston; a valve carried by said piston for controlling communication between said chamber and the cylinder; means carried by said piston for positively locking said valve in the closed position at times; a crank and connecting rod operatively connected with said piston; and means on said rod for operating said valve-locking means.

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Witnesses:

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